APPENDIX B

Air Quality Modeling Protocol

KLEINFELDER
An employee owned company

February 15, 2008
Kleinfelder Project No. 91791

Mr. Kevin Schilling
Airshed Dispersion Modeling Coordinator
Idaho Department of Environmental Quality
Air Quality Division
1410 N. Hilton
Boise, ID 83706

SUBJECT: AMBIENT AIR QUALITY MODELING PROTOCOL for ANDGAR CORPORATION, BETTENCOURT B-6 DAIRY 3350 SOUTH 2400 EAST JEROME, IDAHO 83338

Dear Mr. Schilling:

Kleinfelder is preparing a Permit to Construct (PTC) application on behalf of the Andgar Corporation for Bettencourt B-6 Dairy located near Jerome, Idaho. The Project includes the installation of an anaerobic digester for processing onsite cow manure and three Genset electrical generators for conversion of the digester biogas to electricity.

The proposed Genset electrical generators will result in criteria pollutant emissions of carbon monoxide, particulate matter, nitrogen oxides, sulfur dioxide and volatile organic compounds.

1 EXECUTIVE SUMMARY

The proposed project will also result in potential emissions of non-carcinogenic toxic air pollutants ("TAPs") listed in IDAPA 58.01.01.585 including acrolein, isomers of xylene, styrene, toluene, and trichloroethylene. The potential emissions of these compounds are not expected to exceed their respective listed TAP screening emission levels ("EL"). In addition, the digester will result in emissions of carcinogenic TAPs listed in IDAPA 58.01.01.586 including acetaldehyde, benzene, dichloromethane, formaldehyde, dichloroethylene, and vinyl chloride. The potential emissions for acetaldehyde and trichloroethylene are not expected to exceed the listed TAP EL, however potential emissions for benzene, dichloromethane, formaldehyde and vinyl chloride may exceed each of there respective TAP EL. Therefore, modeling is expected to be required for these specific TAPs to demonstrate compliance with the Acceptable Ambient Concentration (AAC) or each pollutant.

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This ambient air quality modeling protocol ("protocol") is being submitted to the Idaho Department of Environmental Quality Air Quality Division ("IDEQ") for review. The Protocol was prepared consistent with the IDEQ Air Quality Modeling Guidelines ("Guidelines"), revised December 31, 2002, and the associated modeling protocol checklist (see Appendix B). The protocol addresses the approach for assessing the ambient air impacts from the proposed source emissions for comparison with the AAC for TAPs and National Ambient Air Quality Standards (NAAQS) for $PM_{10}/PM_{2.5}$.

We understand that IDEQ staff will review and approve the modeling protocol. If there are any questions or items of discussion, the following points of contact are available:

Andgar Corporation:

Mr. Kyle Juergens
6920 Salishan Pkwy. A-102
Ferndale, Washington 98248
(360) 366-9900
e-mail: kylej@andgar.com

Kleinfelder:

Mr. Andy Marshall, P.E.
2315 S. Cobalt Point Way
Meridian, Idaho 83642
(208) 893-9700
e-mail: amarshall@kleinfelder.com

2 INTRODUCTION AND PURPOSE

2.1. General Overview

Andgar Corporation is proposing to construct an anaerobic digester at Bettencourt B-6 Dairy. Andgar Corporation is constructing the anaerobic digester for Cargill Environmental Finance who in turn is leasing space on the dairy's property. The anaerobic digester is an independent source separate of the dairy.

The facility operates under SIC code 1629. The digester is designed to produce biogas from on-site dairy cattle manure. The resulting biogas will be combusted in three on-site generators that will be used for primary electrical production for the facility and be sold to the local utility. The three generators can operate independently or simultaneously. The electricity will be sold to the local utility. A PTC application will be submitted in support of the permitting for this new air emission source.

Bettencourt B-6 Dairy is a minor source because the potential to emit is less than major source thresholds without requiring limits on its potential to emit.

The facility is located in Gooding County, Idaho which is designated as attainment or unclassifiable for criteria pollutants. The approximate center point of the property is located at UTM 4727165 N by 741792 E, Zone 11. The dairy sits on 1,000 acres and the surrounding area is a sparsely populated, rural area with terrain at about 4,200 feet above mean sea level (MSL). A Site Location Map, Vicinity Map and Facility Layout Map are respectively provided as Figures A-1 through A-3 in Appendix A.

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3 EMISSION AND SOURCE DATA

3.1. Facility Processes and Emission Controls Affected

The proposed source will allow for the production of electricity. Since this is Bettencourt B-6 Dairy's initial PTC, existing facility processes or emission controls will not be affected.

3.2. Emission Points and Future Emission Rates

An estimate of the potential emission rates for the proposed source is summarized in Table 3-1. Since this is a new source the current emission rates for all of these pollutants are zero.

Table 3-1: Potential Emission Rates for Genset Generators

Pollutant	PTE (lbs/hr)	PTE (tons/yr)
PM_{10}	0.17	0.74
SO_2	9.13	40.0
NO_X	5.65	24.75
CO	12.43	54.45
VOC	5.65	24.75
Acetaldehyde	9.8E-04	4.3E-03
Acrolein	4.4E-04	1.9E-03
Benzene	1.2E-02	5.1E-02
Dichloromethane	1.7E-03	7.4E-03
Formaldehyde	2.9E-02	1.3E-01
Isomers of Xylene	2.3E-03	1.0E-02
Styrene	8.9E-04	3.9E-03
Toluene	4.4E-03	1.9E-02
Trichloroethylene	3.4E-04	1.5E-03
Vinyl Chloride	9.5E-04	4.2E-03

There are three Genset electrical generators proposed to be installed adjacent to each other. The two 750 kW generators have their own 12-inch (0.305 meters) diameter stack extending 20 feet (6.1 meters) above ground. The 330 kW generator has an 8-inch (0.203 meters) diameter stack also extending 20 feet (6.1 meters) above ground. The emissions presented in Table 3-1 represent the total potential emissions if all generators were operating simultaneously at capacity. In an emergency situation the biogas will be flared from the digestor. During a flare event the emission characteristics and potential emission rate will be the same as the emission estimate from the Genset generators.

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3.3. Good Engineering Practice (GEP) Stack-height Analysis

The exhaust stack from the genset generators is 20 feet (6.1 meters) in height. Because the stack height is less than 65 meters and is located in simple terrain, the GEP stack-height analysis requires the use of the actual stack height in calculating emission limitations.

3.4. Facility Layout

The facility layout is provided in Figure 3, Appendix A. As shown, the new planned anaerobic digester and biogas electrical generators will be located at the street address 3350 S 2400 E, Jerome, Idaho. The site is southwest of the intersection of W 50 S Road and 2400 E Road. The dairy property includes approximately 1,000 acres. Approximately 1,990 (606 meters) feet east of the emission source is 2400 East Road. This road is the nearest public receptor to the source.

3.5. Source Parameters

The source parameters for the proposed anaerobic digester are summarized in Table 3-2. The Stack Velocity and Stack Temperature are estimates of average operating conditions.

Table 3-2: Source Parameters

Source Description	UTM E	UTM N	Stack Height (m)	Stack Diameter (m)	Stack Velocity (m/sec)	Stack Temp (Deg K)	Receptor Distance (m)
2-Guascor 560 generators	741792	4727165	6.1	0.305	27.8	628	606
1-Guascor 240 generator	741792	4727165	6.1	0.203	28.35	671	606

3.6. Methodology for Including Area and Volume Sources

The new proposed source will be modeled as a point source. Since the proposed generators are the only point source of emissions, no other sources were considered in the modeling analysis. To conservatively assess maximum impacts, each source type will be modeled separately and the maximum source impacts were summed to determine the total maximum impact for the facility. This should provide more conservative modeling results.

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3.7. Methodology for Including/Excluding Sources from the Modeling Analysis

We did not include the digestor flares in the modeling analysis. The use of the flares would only occur in an upset condition and the characteristics of the emissions will be the same as the characteristics of the generator emissions. Including the flares will not have any substantial impact on the modeling results.

4 AIR QUALITY MODELING METHODOLOGY

4.1. Model Selection and Justification

The emission rates from the proposed source exceed the modeling thresholds for criteria pollutants requiring ambient air quality modeling for the proposed source. To properly demonstrate compliance with the ambient air quality standards, the SCREEN3 model was chosen to assess the potential air quality impacts from the project. This model was chosen since the facility consists of a simple terrain and simple and isolated emission source. SCREEN3 uses worst case meteorological conditions to estimate worst case emissions.

4.2. Model Setup and Application

The SCREEN3 model was set up following the EPA Guidelines and generally recommended procedures. The modeling options are kept as regulatory default. The inputs included are listed in Table 3-2.

4.3. Land-use Analysis

Following the land–use classification procedure provided in Appendix E of the IDEQ Modeling Guidelines, the area within 3km of the site has been classified as rural. The majority of the 3km radius around the Bettencourt B-6 Dairy is largely agricultural or undeveloped, with the ground cover being mostly wild grasses, weeds and shrubs, and sparsely located trees.

4.4. Building Downwash

The regulatory building downwash option will be used in SCREEN3. The building housing the genset electrical generators has a height of 6.71 meters, a minimum horizontal dimension of 13.7 meters and a maximum horizontal dimension of 30.5 meters.

4.5. Terrain Options

The terrain surrounding Bettencourt Dairy is relatively flat. The surrounding terrain generally is not greater than the stack base elevation. The flat terrain option was selected for the model.

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4.6. Choice of Meteorology

The full meteorology option was selected as a worst case scenario for meteorological conditions. This includes all stability classes and wind speeds.

4.7. Discrete Distance Options

The discrete distance option was selected to model to the nearest public receptor. The nearest receptor approximately 1,990 (606 meters) feet east of the emission source is 2400 East Road.

4.8. Background Concentrations

Kleinfelder is proposing to use IDEQ's default background concentrations for rural/agricultural areas presented in Table 4-1.

Table 4-1: Background Concentrations for Criteria Pollutants

Criteria Pollutant	24-hr (ug/m3)	Annual (ug/m3)	1-hr (ug/m3)	8-hr (ug/m3)	3-hr (ug/m3)
PM_{10}	73	26			
NO_2	17				
SO_2	26	8	--		34
CO			3,600	2,300	

5 APPLICABLE REGULATORY LIMITS

5.1 Methodology for Evaluation of Compliance with Standards

The modeled concentration of criteria pollutants will be compared to the National Ambient Air Quality Standards to demonstrate that the facility impacts will not cause or contribute to an exceedance of the NAAQS. The compliance standards for criteria pollutants are summarized in Table 5-1.

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Table 5-1: Applicable Standards for Criteria Pollutants

Criteria Pollutant	NAAQS 24-hr (ug/m3)	NAAQS Annual (ug/m3)	NAAQS 1-hr (ug/m3)	NAAQS 8-hr (ug/m3)	NAAQS 3-hr (ug/m3)
Total PM	--	--			
PM_{10}	150	--			
$PM_{2.5}$	35	15			
NO_2	--	100			
SO_2	365	80	--		1,300
CO			40,000	10,000	
Lead					

SCREEN3 produces output for a one-hour average only. This one-hour average concentration must be adjusted to estimate the concentration for the appropriate averaging period. The one-hour average model output will be converted to averaging periods consistent with the standard for the pollutant modeled through the use of persistence factors presented in Table 5-2.

Table 5-2: Persistency Conversion Factors for SCREEN3

Averaging Period	Simple Terrain Conversion Factor
3- hour	0.9
8-hour	0.7
24-hour	0.4
Quarterly	0.13
Annual (Criteria)	0.8
Annual (Carcinogenic TAPs)	0.125

The modeled concentrations of the TAP emissions will be compared to their respective Acceptable Ambient Concentrations presented in IDAPA 58.01.01 Sections 585 and 586. The compliance standards for TAP emissions are summarized in Table 5-2.

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Table 5-3: Applicable Standards for TAPs

TAP	AAC (ug/m3) 24-hr Avg	AACC (ug/m3) Annual Avg
Acetaldehyde		0.45
Acrolein	12.50	
Benzene		0.12
Dichloromethane		0.24
Formaldehyde		0.077
Isomers of Xylene	21,750	
Styrene	1,000	
Toluene	18,750	
Trichloroethylene	13,450	0.77
Vinyl Chloride		0.14

5.2 Preliminary Analysis

The proposed project will also result in potential emissions of non-carcinogenic toxic air pollutants ("TAPs") listed in IDAPA 58.01.01.585 including acrolein, isomers of xylene, styrene, toluene, and trichloroethylene. The potential emissions of these compounds are not expected to exceed their respective listed TAP screening emission levels ("EL"). In addition, the digester will result in emissions of carcinogenic TAPs listed in IDAPA 58.01.01.586 including acetaldehyde, benzene, dichloromethane, formaldehyde, dichloroethylene, and vinyl chloride. The potential emissions for acetaldehyde and trichloroethylene are not expected to exceed the listed TAP EL, however potential emissions for benzene, dichloromethane, formaldehyde and vinyl chloride may exceed each of there respective TAP EL. Therefore, modeling is expected to be required for these specific TAPs to demonstrate compliance with the Acceptable Ambient Concentration (AAC) or each pollutant.

5.3 Full Impact Analysis

The full impact analysis will include an evaluation of the modeled impacts to Ambient air quality. If the maximum modeled concentrations exceed significant contribution levels. The modeled impacts will be added to the respective background concentration for each pollutant.

5.4 Presentation of Results

The results of the air quality modeling will be included in detailed report as an appendix to the Permit to Construct application submitted for the project. A summary of the results will be included in the PTC application. We will follow the State of Idaho Air Quality Modeling Guidelines dated December 31, 2002.

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The report will include a detailed description of the source and the potential emissions, modeling methods and results. The results will be presented in a tabular format for easy comparison to the regulatory limits. The permit application will include documentation and justification for the engineering parameters used in the modeling analysis and calculations presenting how stack gas parameters were estimated.

If you have any questions, please contact the undersigned at (208) 893-9700.

Sincerely,

KLEINFELDER

Kelli Wetzel

Kelli Wetzel
Air Quality Engineer

Andrew Marshall, P.E.
Environmental Department Manager

Attachments:
References

Figures
Figure 1: Site Location Map
Figure 2: Vicinity Map
Figure 3: Facility Layout Detail

Modeling Protocol Checklist

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REFERENCES

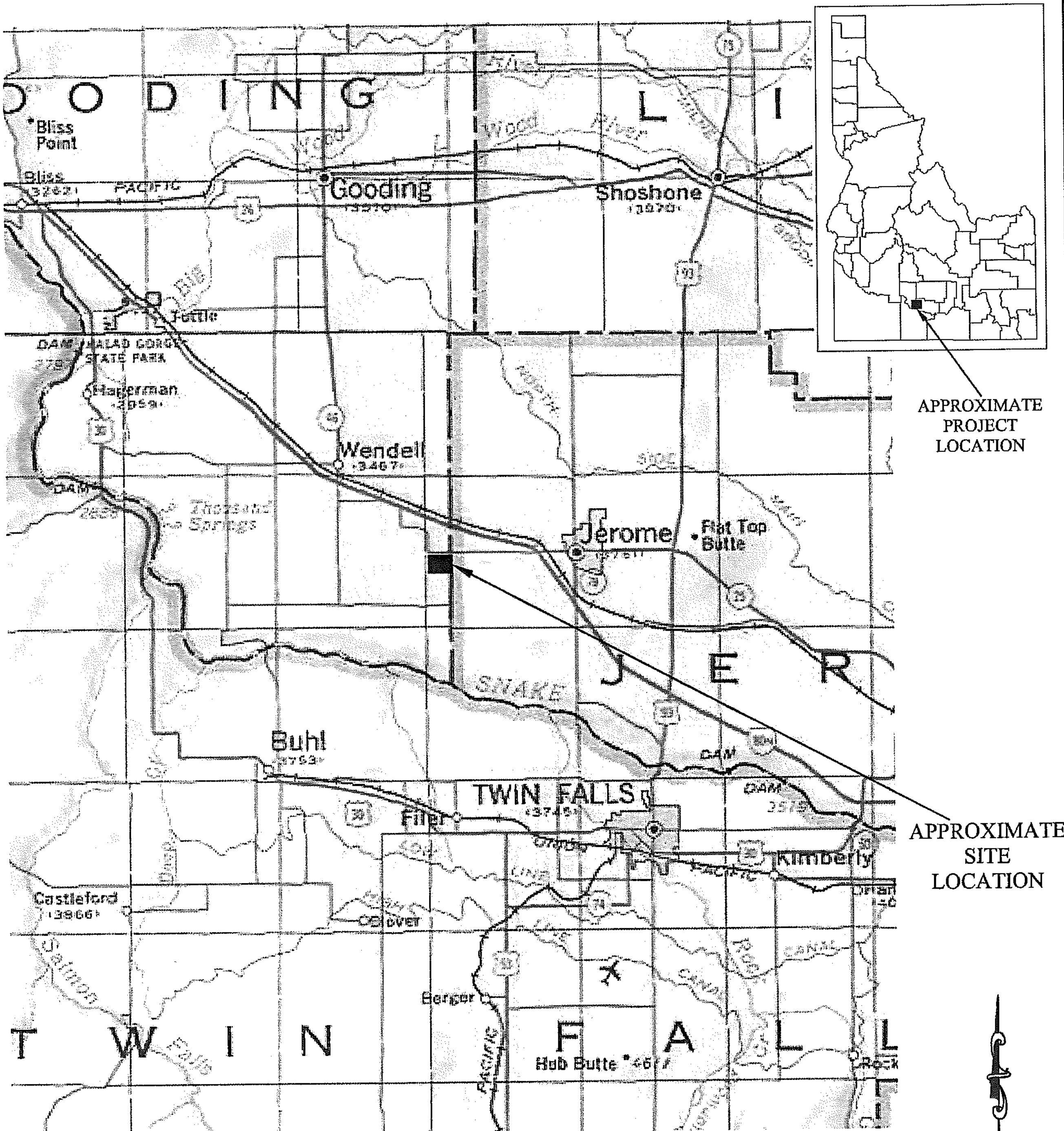
EPA, 2000. *Meteorological Monitoring Guidance for Regulatory Modeling Applications*. EPA Publication No. EPA-454/R-99-005. U.S. Environmental Protection Agency, Research Triangle Park, NC.

EPA, 1995. *SCREEN3 Model User's Guide*. U.S. Environmental Protection Agency, Research Triangle Park, NC.

EPA's SCRAM Web site: http://www.epa.gov/scram001/index.htm.

IDAPA 58.01.01, et seq. *Rules for the Control of Air Pollution in Idaho.*

IDEQ, 2002. *State of Idaho Air Quality Modeling Guideline*, Doc. IDAQ-011 (rev. 1 12/31/02).



SOURCE: TOPO! © 2000 National Geographic Holdings

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Scale in Miles

KLEINFELDER

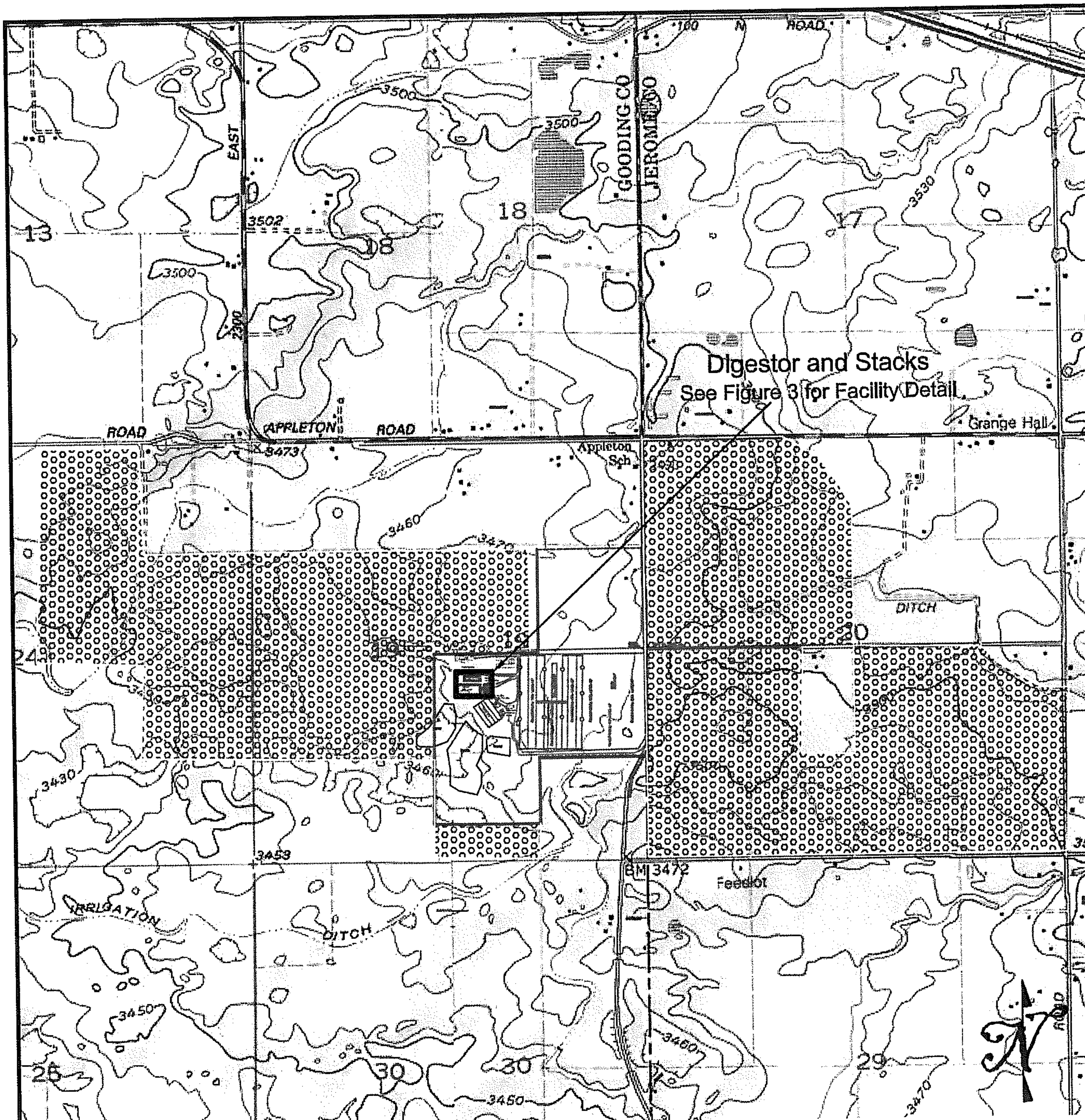
2315 S. Cobalt Point Way
Meridian, Idaho 83642
PH. 208-893-9700 FAX. 208-893-9703
www.kleinfelder.com

SITE LOCATION MAP

Andgar Bettencourt B6 Digester
3350 S. 2400 E.
Jerome, Idaho

DRAWN BY: A. Kartchner	REVISED BY: A.Kartchner	CHECKED BY: K. Wetzel	FIGURE 1

DRAWN: Feb 2008 | APPROVED BY: | PROJECT NO. 91791 | FILE NAME:

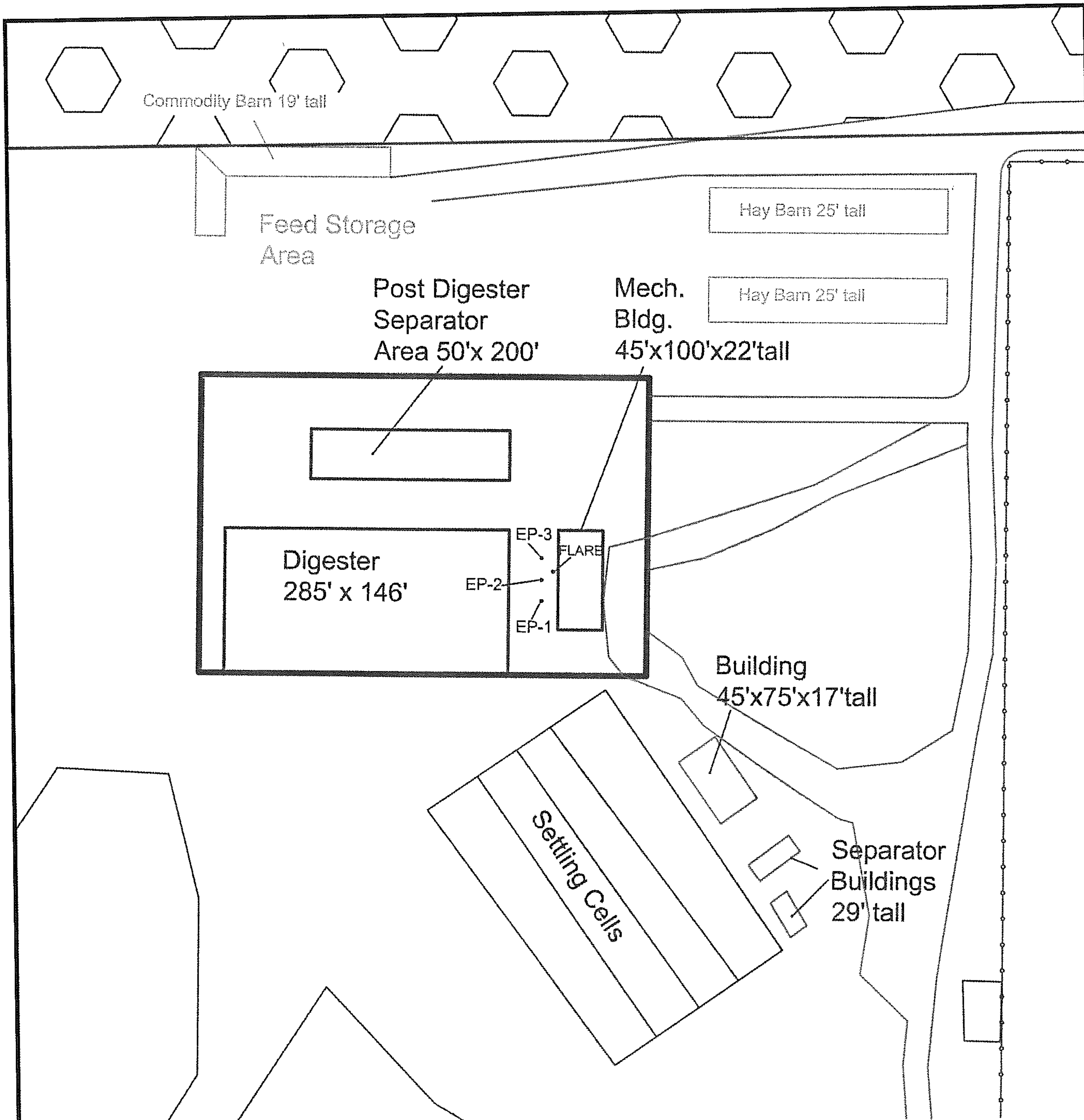


Base Map Source: USGS 1:24,000 Scale Quadrangle Maps: Jerome, Idaho 1982 and Niagara Springs, Idaho 1982.
Facility Drawing provided by AgTec Engineering & Environmental Associates, LLC, January 2008

1.0 0.5 0 0.5

Approximate Scale in Feet

KLEINFELDER 2315 S. Cobalt Point Way Meridian, Idaho 83642 PH. 208-893-9700 FAX. 208-893-9703 www.kleinfelder.com	VICINITY MAP Andgar Bettencourt B6 Digestor 3350 S. 3400 E. Jerome, Idaho	DRAWN BY: A. Kartchner REVISED BY: A. Kartchner CHECKED BY: K. Wetzel FIGURE 2
DRAWN: Feb 2008 APPROVED BY:	PROJECT NO. 91791 FILE NAME:	



Facility Drawing Provided by AgTec Engineering & Environmental Associates, LLC, January 2008

KLEINFELDER 2315 S. Cobalt Point Way Meridian, Idaho 83642 PH. 208-893-9700 FAX. 208-893-9703 www.kleinfelder.com	**FACILITY DETAIL** Andgar Bettencourt B6 Digestor 3350 S. 3400 E. Jerome, Idaho	DRAWN BY: A. Kartchner REVISED BY: A. Kartchner CHECKED BY: K. Wetzel FIGURE **3**
DRAWN: Feb 2008 APPROVED BY:	PROJECT NO. 91791 FILE NAME:	

Table A-1
Modeling Protocol Checklist for New Minor Sources or Minor Modifications

Checklist Item	Completed (yes / no)	Protocol Section
Introduction and Purpose	Yes	2
• General overview, facility description, terrain description	Yes	2.1
• Project Overview	Yes	2.1
• Goals of the air quality impact analysis (i.e., demonstrate compliance for a permit to construct or a Tier II operating permit)	Yes	2.1
• Applicable regulations and requirements	Yes	Exec Summary
• Pollutants of concern	Yes	Exec Summary
Emission and Source Data	Yes	3
• Facility processes and emission controls effected by the permitting action	Yes	3.1
• Include a list of emission points that will be included in the application. Present a table showing current actual and future allowable emission rates (in maximum pounds per hour tons per year) and the requested emission increase (future allowable minus current actual)	Yes	3.2
• Good engineering practice (GEP) stack-height analysis	Yes	3.3
• Facility layout: location of sources, buildings, and fence lines	Yes	3.4
• Source parameters (emissions rates, UTM coordinates, stack height, stack elevation, stack diameter, stack-gas exit velocity, and stack-gas exit temperature) for each new or modified emission point	Yes	3.5
• Methodology for including area and volume sources in the modeling analysis	Yes	3.6
• Methodology for including/excluding sources from the modeling analysis	Yes	3.7
Air Quality Modeling Methodology	Yes	4
• Model selection and justification	Yes	4.1
• Model setup and application - Model options (i.e., regulatory default) - *Terrain Options* - *Land-use analysis* - *Building Downwash* - *Choice of Meteorology* - *Discrete Distance Option*	Yes	4.2
• Elevation data - *Methodology for accounting for complex terrain*	n/a	

Table A-1 (Continued)
Modeling Protocol Checklist for New Minor Sources or Minor Modifications

Checklist Item	Completed (yes / no)	Protocol Section
• Receptor network - *Description of receptor grids – include methodology for ensuring the maximum concentration will be estimated* - *Discussion/justification of ambient air* - *Determination of receptor elevations*	n/a	
• Meteorological data - *Selection of meteorological databases – justification of appropriateness of meteorological data to area of interest* - *Meteorological data processing* - *Meteorological data analysis (e.g., wind rose)*	Yes	4.6
• Background concentrations	n/a	
Applicable Regulatory Limits	Yes	5
• Methodology for evaluation of compliance with standards (i.e., determination of design concentration)	Yes	5.1
• Full impact analysis - *TAPs analysis* - *NAAQS analysis*	Yes	5.1
• Presentation of results – state how the results of the modeling analysis will be displayed (i.e., list what information will be included)	Yes	5.1
References	Yes	6

APPENDIX C

Modeling Protocol Approval Letter

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1410 NORTH HILTON, BOISE, ID 83706 · (208) 373-0502

C. L. "BUTCH" OTTER, GOVERNOR
TONI HARDESTY, DIRECTOR

February 29, 2008

Kelli Wetzel
Kleinfelder
Boise, Idaho

RE: Modeling Protocol for an Anaerobic Digester and Generators at Bettencourt B-6 Dairy in Gooding County, Idaho

Kelli:

DEQ received your dispersion modeling protocol on February 15, 2008. The modeling protocol was submitted on behalf of Andgar Corporporation (Andgar) for Bettencourt B-6 Dairy (Bettencourt). The modeling protocol proposes methods and data for use in the ambient impact analyses of a Permit to Construct application for construction of an anaerobic digester and three electrical generators to be located on property leased from Bettencourt in Gooding County, Idaho.

The modeling protocol has been reviewed and DEQ has the following comments:

- Comment 1: Facility Definition and Ambient Air Boundary. The protocol asserts the digester and generators will be a separate facility from the Bettencourt Dairy, and that Cargill Environmental Finance will be leasing space on Bettencourt's property. If these are separate facilities, then the ambient air boundary will be the boundary of the leased property rather than the property boundary of the dairy.

  A good test to evaluate whether it should be one or two facilities with regard to ambient air is to examine how exposures to emissions would be legally handled. If a single occupational health and safety program would have authority and responsibility for employees of both the dairy and the digester facility, then both facilities could be considered as one for the purpose of establishing the ambient air boundary.

- Comment 2: Use of SCREEN3. The use of SCREEN3 is approvable for this project provided the following are met:

  1. Each generator is modeled at emissions associated with maximum allowable operations, and the maximum 1-hour concentration for each generator is recorded. The total impact is the sum of maximum modeled concentrations determined for each of the three generators.
  2. Building dimensions used for downwash must be those associated with the worst-case building. The governing building is that building the results in the

highest GEP stack height calculation. The GEP height is given by H = S + 1.5L, where S = the height of the building and L = the lesser dimension of either the height or projected width. Any emissions stack with a distance of 5L may cause plume downwash and should be evaluated.

Comment 3: Documentation and Verification of Stack Parameters. The application should provide documentation and justification for stack parameters used in the modeling analyses, clearly showing how stack gas temperatures and flow rates were estimated. In most instances, applicants should use typical parameters, not maximum temperatures and flow rates. If the application does not clearly indicate how values for parameters were measured or calculated, the application will be determined incomplete.

DEQ's modeling staff considers the submitted dispersion modeling protocol, with resolution of the additional items noted above, to be approved. It should be noted, however, that the approval of this modeling protocol is not meant to imply approval of a completed dispersion modeling analysis. Please refer to the *State of Idaho Air Quality Modeling Guideline*, which is available on the Internet at http://www.deq.state.id.us/air/permits_forms/permitting/modeling_guideline.pdf, for further guidance.

To ensure a complete and timely review of the final analysis, our modeling staff requests that copies of all modeling input and output files are submitted with an analysis report. If you have any further questions or comments, please contact me at (208) 373-0112.

Sincerely,

Kevin Schilling

Kevin Schilling
Stationary Source Air Modeling Coordinator
Idaho Department of Environmental Quality
208 373-0112

APPENDIX D

Emissions Calculations and Screen3 Output

Emission Assumptions
Bettencourt B-6 Dairy, Jerome, Idaho
Two GE Jenbacher 416 Genset Electrical Generators

Calculation Input Assumptions

Engine Break horsepower	**1,573**	BHP/engine	
Number of Engines	**2**		
Total Gas generated	**825,500**	cf/day	
Btu value of gas	**565**	Btu/cf	
Annual operating hours	**8,760**	hrs/year	
Flare operating hours	**8,760**	hrs/year	
Flare operating Percentage	100%		For estimating worst case emission estimate
Flare heat release rate	1,360,355.21	cal/sec	
Flare height	**20**	ft	
Genset exhaust gas flow rate	**177,840**	cf/hr	
Genset exhaust temp	**878**	deg F	

Emission Calculations at Full Capacity
Bettencourt B-6 Dairy, Jerome, Idaho
Two GE Jenbacher 416 Genset Electrical Generators

Capacity Assumptions		
Gas generation	825,500	cf/day
Annual Gas consumption	301	MMcf/year
Heat value	565	Btu/cf
Hourly Btu input	19.43	MMBtu/hr
Annual BTU input	170,239	MMBtu/yr

lbs/hr x 0.126 = g/sec

Pollutant	Emission factor (lb/MMbtu)	Data Source	Emissions lbs/hr	Emissions tons/yr	Emissions grams/sec
PM10	9.99E-03	AP-42 Section 3.2, Table 3.2-2 (includes filterable and condensible)	0.19	0.85	2.4E-02
PM2.5	9.99E-03		0.19	0.85	2.4E-02
SO2	1.05E-01	Vendor	2.03	8.90	2.6E-01
NOx	3.93E-01	Vendor	7.63	33.42	9.6E-01
CO	1.07E+00	Vendor	20.81	91.14	2.6E+00
VOC	8.92E-02	Vendor	1.73	7.59	2.2E-01
Lead	nd	Vendor			0.0E+00
Acetaldehyde	5.30E-05	EPA AP-42 Section 3.1, April 2000 (Rating D)	1.0E-03	4.5E-03	1.3E-04
Acrolein	2.60E-05	JMM cons eng. Dec 10, 1990 - Fire database (Rating U)	5.1E-04	2.2E-03	6.4E-05
Benzene	6.90E-04	Radian fire database 1993 release (Rating U)	1.3E-02	5.9E-02	1.7E-03
Dichloromethane	1.01E-04	Radian fire database 1993 release (Rating U)	2.0E-03	8.6E-03	2.5E-04
Formaldehyde	1.90E-04	EPA AP-42 Section 3.1, April 2000 (Rating D)	3.7E-03	1.6E-02	4.7E-04
Isomers of Xylene	1.37E-04	Radian fire database 1993 release (Rating U)	2.7E-03	1.2E-02	3.3E-04
Nickel	2.00E-06	EPA AP-42 Section 3.1, April 2000 (Rating D)	3.9E-05	1.7E-04	4.9E-06
Selenium	1.10E-05	EPA AP-42 Section 3.1, April 2000 (Rating D)	2.1E-04	9.4E-04	2.7E-05
Styrene	5.26E-05	Radian fire database 1993 release (Rating U)	1.0E-03	4.5E-03	1.3E-04
Toluene	2.62E-04	Radian fire database 1993 release (Rating U)	5.1E-03	2.2E-02	6.4E-04
Trichloroethylene	2.00E-05	JMM cons eng. Dec 10, 1990 - Fire database (Rating U)	3.9E-04	1.7E-03	4.9E-05
Vinyl Chloride	5.60E-05	JMM cons eng. Dec 10, 1990 - Fire database (Rating U)	1.1E-03	4.8E-03	1.4E-04

Emission Factor Calculation Details

Refer to Stoichiometric conversion of H2S to SO2 following worksheet

1.1	gr/ bhp-hour	/	453.59	gr/lb	/	6,177	BTU/bhp-hour	=	3.93E-07	lb/BTU
3	gr/ bhp-hour	/	453.59	gr/lb	/	6,177	BTU/bhp-hour	=	1.07E-06	lb/BTU
0.25	gr/ bhp-hour	/	453.59	gr/lb	/	6,177	BTU/bhp-hour	=	8.92E-08	lb/BTU

Total Emissions Compared to TAP Screening Els

Pollutant	Emissions lbs/hr	Emissions tons/yr	Emissions grams/sec	TAP Screening: TAP Screening EL (lb/hr)	TAP Screening: Exceeds EL?
PM10	0.19	0.85	2.4E-02	Not applicable	
PM2.5	0.19	0.85	2.4E-02		
SO2	2.03	8.90	2.6E-01		
NOx	7.63	33.42	9.6E-01		
CO	20.81	91.14	2.6E+00		
VOC	1.73	7.59	2.2E-01		
Lead					
Acetaldehyde	1.0E-03	4.5E-03	1.3E-04	3.0E-03	No
Acrolein	5.1E-04	2.2E-03	6.4E-05	1.7E-02	No
Benzene	1.3E-02	5.9E-02	1.7E-03	8.0E-04	Yes
Dichloromethane	2.0E-03	8.6E-03	2.5E-04	1.6E-03	Yes
Formaldehyde	3.7E-03	1.6E-02	4.7E-04	5.1E-04	Yes
Isomers of Xylene	2.7E-03	1.2E-02	3.3E-04	2.9E+01	No
Nickel	3.9E-05	1.7E-04	4.9E-06	2.7E-05	Yes
Selenium	2.1E-04	9.4E-04	2.7E-05	1.3E-02	No
Styrene	1.0E-03	4.5E-03	1.3E-04	6.7E+00	No
Toluene	5.1E-03	2.2E-02	6.4E-04	2.5E+01	No
Trichloroethylene	3.9E-04	1.7E-03	4.9E-05	5.1E-04	No
Vinyl Chloride	1.1E-03	4.8E-03	1.4E-04	9.4E-04	Yes

Engine Modeling Results at Full Capacity
Bettencourt B-6 Dairy, Jerome, Idaho
Two GE Jenbacher 416 Genset Electrical Generators

Persistency Factors	
3 hour	0.9
8 hour	0.7
24 hour	0.4
Annual criteria	0.08
Annual TAPs	0.125

Maximum SCREEN3 Impact using concentration input of 1 gram/sec (X/Q):
Model Results 542.80 (ug/m3)/(g/s)

Two GE Jenbacher 416 Genset Electrical Generators

Pollutant	Emissions (grams/sec)	Estimated Impacts (ug/m3) (1 hr avg)
PM10	2.45E-02	1.33E+01
PM2.5	2.45E-02	1.33E+01
SO2	2.56E-01	1.39E+02
NO2 (Note 1)	7.21E-01	3.91E+02
CO	2.62E+00	1.42E+03
VOC	2.18E-01	Modeling not conducted
Lead	0.00E+00	
Acetaldehyde	1.30E-04	Emissions are below EL
Acrolein	6.37E-05	Emissions are below EL
Benzene	1.69E-03	9.17E-01
Dichloromethane	2.47E-04	1.34E-01
Formaldehyde	4.65E-04	2.53E-01
Isomers of Xylene	3.35E-04	Emissions are below EL
Nickel	4.90E-06	2.66E-03
Selenium	2.69E-05	Emissions are below EL
Styrene	1.29E-04	Emissions are below EL
Toluene	6.42E-04	Emissions are below EL
Trichloroethylene	4.90E-05	Emissions are below EL
Vinyl Chloride	1.37E-04	7.44E-02

Notes
1. NOx conversion to NO2 assumed 0.75, per EPA guidance.

Pollutant	Emissions (grams/sec)	Estimated Impacts (ug/m3) (1 hr avg)	1-hr average adjusted to 24 hr average	1 -hr average adjusted to annual average	1-hr average adjusted to 8 hr average	1-hr average adjusted to 3 hr average
PM10	2.45E-02	1.33E+01	5.31E+00	1.06E+00		
PM2.5	2.45E-02	1.33E+01	5.31E+00	1.06E+00		
SO2	2.56E-01	1.39E+02	5.56E+01	1.11E+01		1.25E+02
NO2 (Note 1)	7.21E-01	3.91E+02		3.13E+01		
CO	2.62E+00	1.42E+03			9.96E+02	
VOC	2.18E-01	Modeling not conducted				
Lead	0.00E+00	0.00E+00				
Acetaldehyde	1.30E-04	Emissions are below EL				
Acrolein	6.37E-05	Emissions are below EL				
Benzene	1.69E-03	9.17E-01		1.15E-01		
Dichloromethane	2.47E-04	1.34E-01		1.67E-02		
Formaldehyde	4.65E-04	2.53E-01		3.16E-02		
Isomers of Xylene	3.35E-04	Emissions are below EL				
Nickel	4.90E-06	2.66E-03		3.32E-04		
Selenium	2.69E-05	Emissions are below EL				
Styrene	1.29E-04	Emissions are below EL				
Toluene	6.42E-04	Emissions are below EL				
Trichloroethylene	4.90E-05	Emissions are below EL				
Vinyl Chloride	1.37E-04	7.44E-02		9.30E-03		

Notes
1. NOx conversion to NO2 assumed 0.75, per EPA guidance.

DEQ Background Concentrations For Rural Areas

Pollutant		Background Concentration (ug/m3)
PM10	24 hour	73
	Annual	26
SO2	3 hour	34
	24 hour	26
	Annual	8
NO2	Annual	17
CO	1 hour	3,600
	8 hour	2,300

Estimated Impacts Including Background Concentrations

Pollutant		Modeled Impact (ug/m3)
PM10	24 hour	78
	Annual	27
SO2	3 hour	159
	24 hour	82
	Annual	19
NO2	Annual	48
CO	1 hour	5,023
	8 hour	3,296

Pollutant	Averaging Period	Modeled Impacts (μg/m³) (Note 1)	NAAQS or AAC (μg/m³)
PM_{10}	24 hour	78.31	150
	Annual	27.06	50
$PM_{2.5}$	24 hour	Note 2	35
	Annual		15
NO_2	Annual	48.31	100
SO_2	3 hour	159.13	1,300
	24 hour	81.61	365
	Annual	19.12	80
CO	1 hour	5,023.03	40,000
	8 hour	3,296.12	10,000
Acetaldehyde	Annual	Below TAP EL	
Acrolein	24 hour	Below TAP EL	
Benzene	Annual	0.11	0.12
Dichloromethane	Annual	0.02	0.24
Formaldehyde	Annual	0.03	0.08
Isomers of Xylene	24 hour	Below TAP EL	
Nickel	Annual	0.00033	0.004
Selenium	24 hour	Below TAP EL	
Styrene	24 hour	Below TAP EL	
Toluene	24 hour	Below TAP EL	
Trichloroethylene	24 hour Annual	Below TAP ELs	
Vinyl Chloride	Annual	0.01	0.14

Note 1 – Modeled impacts for primary pollutants considers background concentrations.
Note 2 – Background for PM2.5 has not been established and modeled impacts could not be determined

Flare Emissions at Full Capacity
Bettencourt B-6 Dairy, Jerome, Idaho
Two GE Jenbacher 416 Genset Electrical Generators

Capacity Assumptions		
Gas generation	825,500	cf/day
Annual Gas consumption	301	MMcf/year
Heat value	565	Btu/cf
Hourly Btu input	19.43	MMBtu/hr
Annual BTU input	170,239	MMBtu/yr

lbs/hr x 0.125997 = g/sec

Pollutant	factor (lb/MMbtu)	Data Source	Emissions lbs/hr	tons/yr	grams/sec	
PM10	7.50E-03	EPA RACT/BACT/LAER Clearinghouse (RBLC)	0.15	0.64	1.8E-02	
PM2.5	7.50E-03	RBLC ID# IA-0088	0.15	0.64	1.8E-02	
SO2	7.17E-01	Vendor	13.94	61.06	1.8E+00	Refer to Stoichiometric conversion of H2S to SO2 following worksheet
NOx	1.00E-01		1.94	8.51	2.4E-01	
CO	2.00E-01	EPA RACT/BACT/LAER Clearinghouse (RBLC)	3.89	17.02	4.9E-01	
VOC	3.60E-01	RBLC ID# IA-0088	7.00	30.64	8.8E-01	
Lead	nd				0.0E+00	
Acetaldehyde	5.30E-05	EPA AP-42 Section 3.1, April 2000 (Rating D)	1.0E-03	4.5E-03	1.3E-04	
Acrolein	2.60E-05	JMM cons eng. Dec 10, 1990 - Fire database (Rating U)	5.1E-04	2.2E-03	6.4E-05	
Benzene	6.90E-04	Radian fire database 1993 release (Rating U)	1.3E-02	5.9E-02	1.7E-03	
Dichloromethane	1.01E-04	Radian fire database 1993 release (Rating U)	2.0E-03	8.6E-03	2.5E-04	
Formaldehyde	1.90E-04	EPA AP-42 Section 3.1, April 2000 (Rating D)	3.7E-03	1.6E-02	4.7E-04	
Isomers of Xylene	1.37E-04	Radian fire database 1993 release (Rating U)	2.7E-03	1.2E-02	3.3E-04	
Nickel	2.00E-06	EPA AP-42 Section 3.1, April 2000 (Rating D)	3.9E-05	1.7E-04	4.9E-06	
Selenium	1.10E-05	EPA AP-42 Section 3.1, April 2000 (Rating D)	2.1E-04	9.4E-04	2.7E-05	
Styrene	5.26E-05	Radian fire database 1993 release (Rating U)	1.0E-03	4.5E-03	1.3E-04	
Toluene	2.62E-04	Radian fire database 1993 release (Rating U)	5.1E-03	2.2E-02	6.4E-04	
Trichloroethylene	2.00E-05	JMM cons eng. Dec 10, 1990 - Fire database (Rating U)	3.9E-04	1.7E-03	4.9E-05	
Vinyl Chloride	5.60E-05	JMM cons eng. Dec 10, 1990 - Fire database (Rating U)	1.1E-03	4.8E-03	1.4E-04	

Emission Factor Calculation Details

Total Emissions Compared to TAP Screening Els

Pollutant	Emissions lbs/hr	tons/yr	grams/sec	TAP Screening: TAP Screening EL (lb/hr)	Exceeds EL?
PM10	0.15	0.64	1.8E-02	Not applicable	
PM2.5	0.15	0.64	1.8E-02		
SO2	13.94	61.06	1.8E+00		
NOx	1.94	8.51	2.4E-01		
CO	3.89	17.02	4.9E-01		
VOC	7.00	30.64	8.8E-01		
Lead					
Acetaldehyde	1.0E-03	4.5E-03	1.3E-04	3.0E-03	No
Acrolein	5.1E-04	2.2E-03	6.4E-05	1.7E-02	No
Benzene	1.3E-02	5.9E-02	1.7E-03	8.0E-04	Yes
Dichloromethane	2.0E-03	8.6E-03	2.5E-04	1.6E-03	Yes
Formaldehyde	3.7E-03	1.6E-02	4.7E-04	5.1E-04	Yes
Isomers of Xylene	2.7E-03	1.2E-02	3.3E-04	2.9E+01	No
Nickel	3.9E-05	1.7E-04	4.9E-06	2.7E-05	Yes
Selenium	2.1E-04	9.4E-04	2.7E-05	1.3E-02	No
Styrene	1.0E-03	4.5E-03	1.3E-04	6.7E+00	No
Toluene	5.1E-03	2.2E-02	6.4E-04	2.5E+01	No
Trichloroethylene	3.9E-04	1.7E-03	4.9E-05	5.1E-04	No
Vinyl Chloride	1.1E-03	4.8E-03	1.4E-04	9.4E-04	Yes

Flare Modeling Results at Full Capacity
Bettencourt B-6 Dairy, Jerome, Idaho
Two GE Jenbacher 416 Genset Electrical Generators

Persistency Factors	
3 hour	0.9
8 hour	0.7
24 hour	0.4
Annual criterie	0.08
Annual TAPs	0.125

Maximum SCREEN3 Impact using concentration input of 1 gram/sec (X/Q):
Model Results 80.76 (ug/m3)/(g/s)

Two GE Jenbacher 416 Genset Electrical Generators

Pollutant	Emissions (grams/sec)	Estimated Impacts (ug/m3) (1-hr avg)
PM10	1.84E-02	1.48E+00
PM2.5	1.84E-02	1.48E+00
SO2	1.76E+00	1.42E+02
NO2 (Note 1)	2.45E-01	1.98E+01
CO	4.90E-01	3.95E+01
VOC	8.81E-01	Modeling not conducted
Lead	0.00E+00	
Acetaldehyde	1.30E-04	Emissions are below EL
Acrolein	6.37E-05	Emissions are below EL
Benzene	1.69E-03	1.36E-01
Dichloromethane	2.47E-04	1.99E-02
Formaldehyde	4.65E-04	3.76E-02
Isomers of Xylene	3.35E-04	Emissions are below EL
Nickel	4.90E-06	3.95E-04
Selenium	2.69E-05	Emissions are below EL
Styrene	1.29E-04	Emissions are below EL
Toluene	6.42E-04	Emissions are below EL
Trichloroethylene	4.90E-05	Emissions are below EL
Vinyl Chloride	1.37E-04	1.11E-02

Notes
1. NOx conversion to NO2 assumed 0.75, per EPA guidance.

Pollutant	Emissions (grams/sec)	Estimated Impacts (ug/m3) (1-hr avg)	1-hr average adjusted to 24 hr average	1 -hr average adjusted to annual average	1-hr average adjusted to 8 hr average	1-hr average adjusted to 3 hr average
PM10	1.84E-02	1.48E+00	5.93E-01	1.19E-01		
PM2.5	1.84E-02	1.48E+00	5.93E-01	1.19E-01		
SO2	1.76E+00	1.42E+02	5.67E+01	1.13E+01		1.28E+02
NO2 (Note 1)	2.45E-01	1.98E+01		1.58E+00		
CO	4.90E-01	3.95E+01			2.77E+01	
VOC	8.81E-01			Modeling not conducted		
Lead	0.00E+00	0.00E+00				
Acetaldehyde	1.30E-04			Emissions are below EL		
Acrolein	6.37E-05			Emissions are below EL		
Benzene	1.69E-03	1.36E-01		1.70E-02		
Dichloromethane	2.47E-04	1.99E-02		2.49E-03		
Formaldehyde	4.65E-04	3.76E-02		4.70E-03		
Isomers of Xylene	3.35E-04			Emissions are below EL		
Nickel	4.90E-06	3.95E-04		4.94E-05		
Selenium	2.69E-05			Emissions are below EL		
Styrene	1.29E-04			Emissions are below EL		
Toluene	6.42E-04			Emissions are below EL		
Trichloroethylene	4.90E-05			Emissions are below EL		
Vinyl Chloride	1.37E-04	1.11E-02		1.38E-03		

Notes
1. NOx conversion to NO2 assumed 0.75, per EPA guidance.

DEQ Background Concentrations For Rural Areas

Pollutant	Background Concentration (ug/m3)
PM10	73
	26
SO2	34
	26
	8
NO2	17
CO	3,600
	2,300

Estimated Impacts Including Background Concentrations

Pollutant		Modeled Impact (ug/m3)
PM10	24 hour	74
	Annual	26
SO2	3 hour	162
	24 hour	83
	Annual	19
NO2	Annual	19
CO	1 hour	3,640
	8 hour	2,328

Pollutant	Averaging Period	Modeled Impacts ($\mu g/m^3$) (Note 1)	NAAQS or AAC ($\mu g/m^3$)
PM_{10}	24 hour	74	150
	Annual	26	50
$PM_{2.5}$	24 hour		35
	Annual	Note 2	15
NO_2	Annual	19	100
SO_2	3 hour	162	1,300
	24 hour	83	365
	Annual	19	80
CO	1 hour	3,640	40,000
	8 hour	2,328	10,000
Acetaldehyde	Annual	Below TAP EL	
Acrolein	24 hour	Below TAP EL	
Benzene	Annual	0.02	0.12
Dichloromethane	Annual	0.002	0.24
Formaldehyde	Annual	0.005	0.08
Isomers of Xylene	24 hour	Below TAP EL	
Nickel	Annual	0.00005	0.004
Selenium	24 hour	Below TAP EL	
Styrene	24 hour	Below TAP EL	
Toluene	24 hour	Below TAP EL	
Trichloroethylene	24 hour Annual	Below TAP ELs	
Vinyl Chloride	Annual	0.001	0.14

Note 1 – Modeled impacts for primary pollutants considers background concentrations.
Note 2 – Background for PM2.5 has not been established and modeled impacts could not be determined

H2S to SO2 Conversion
Bettencourt B-6 Dairy, Jerome, Idaho
Two GE Jenbacher 416 Genset Electrical Generators

Assumptions for gas stream entering Gensets:

- **350** ppm SO2 concentration
- **379** scf gas/lb-mole
- **34** Molecular weight of H2S
- **64** Molecular weight of SO2
- **9.55** scf/sec exhaust rate

$$\frac{350 \text{ cf H2S}}{1.00\text{E+06 cf}} \times \frac{9.554398 \text{ scf}}{1 \text{ sec}} \times \frac{3{,}600 \text{ sec}}{1 \text{ hr}} \times \frac{1 \text{ lb-mole}}{379 \text{ scf}} \times \frac{34 \text{ mole}}{1} = \frac{1.08 \text{ lb H2S}}{\text{hr}}$$

$$\frac{1.08 \text{ lb H2S}}{1 \text{ hr}} \times \frac{64 \text{ mole SO2}}{34 \text{ mole H2S}} = \frac{\mathbf{2.03 \text{ lb SO2}}}{\mathbf{hr}}$$

Emission Factor

$$\frac{2.03 \text{ lb SO2}}{\text{hr}} \times \frac{\text{hr}}{19.43 \text{ MMBtu}} = \frac{\mathbf{0.105 \text{ lb SO2}}}{\mathbf{MMBtu}}$$

Assumptions for gas stream entering the Flare:

- **2,400** ppm SO2 concentration
- **379** scf gas/lb-mole
- **34** Molecular weight of H2S
- **64** Molecular weight of SO2
- **9.55** scf/sec exhaust rate

$$\frac{2{,}400 \text{ cf H2S}}{1.00\text{E+06 cf}} \times \frac{9.554398 \text{ scf}}{1 \text{ sec}} \times \frac{3{,}600 \text{ sec}}{1 \text{ hr}} \times \frac{1 \text{ lb-mole}}{379 \text{ scf}} \times \frac{34 \text{ mole}}{1} = \frac{7.41 \text{ lb H2S}}{\text{hr}}$$

$$\frac{7.41 \text{ lb H2S}}{1 \text{ hr}} \times \frac{64 \text{ mole SO2}}{34 \text{ mole H2S}} = \frac{\mathbf{13.94 \text{ lb SO2}}}{\mathbf{hr}}$$

Emission Factor

$$\frac{13.94 \text{ lb SO2}}{\text{hr}} \times \frac{\text{hr}}{19.43 \text{ MMBtu}} = \frac{\mathbf{0.717 \text{ lb SO2}}}{\mathbf{MMBtu}}$$

07/29/08
17:11:44

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

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SIMPLE TERRAIN INPUTS:
   SOURCE TYPE             =        FLARE
   EMISSION RATE (G/S)     =      1.00000
   FLARE STACK HEIGHT (M)  =       6.0960
   TOT HEAT RLS (CAL/S)    =     .136036E+07
   RECEPTOR HEIGHT (M)     =        .0000
   URBAN/RURAL OPTION      =        RURAL
   EFF RELEASE HEIGHT (M)  =       9.9941
   BUILDING HEIGHT (M)     =       5.2000
   MIN HORIZ BLDG DIM (M)  =      13.7000
   MAX HORIZ BLDG DIM (M)  =      22.9000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.


BUOY. FLUX =   22.555 M**4/S**3;  MOM. FLUX =   13.754 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST      CONC              U10M    USTK   MIX HT   PLUME   SIGMA   SIGMA
   (M)   (UG/M**3)   STAB    (M/S)   (M/S)    (M)     HT (M)   Y (M)   Z (M)  DWASH
 -------  ----------  ----   -----   -----  ------   ------   ------  ------  -----
     1.    .0000       1      1.0     1.0   320.0   231.74     1.92    1.88    NO
   100.    53.06       4     20.0    20.0  6400.0    14.09     8.32    8.18    HS
   200.    30.81       4     20.0    20.0  6400.0    16.95    15.72   11.89    HS
   300.    20.21       4     20.0    20.0  6400.0    19.35    22.80   14.95    HS
   400.    15.82       4     15.0    15.0  4800.0    24.52    29.76   18.22    HS
   500.    14.06       4     15.0    15.0  4800.0    24.52    36.39   21.08    HS

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND     1. M:
    52.    80.76       4     20.0    20.0  6400.0    12.41     4.64    6.34    HS

  DWASH=   MEANS NO CALC MADE (CONC = 0.0)
  DWASH=NO MEANS NO BUILDING DOWNWASH USED
  DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
  DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
  DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST      CONC              U10M    USTK   MIX HT   PLUME   SIGMA   SIGMA
   (M)   (UG/M**3)   STAB    (M/S)   (M/S)    (M)     HT (M)   Y (M)   Z (M)  DWASH
 -------  ----------  ----   -----   -----  ------   ------   ------  ------  -----
    21.    50.55       4     20.0    20.0  6400.0    10.96     2.01    4.05    HS
```

```
 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****************************************
     *** REGULATORY (Default) ***
    PERFORMING CAVITY CALCULATIONS
  WITH ORIGINAL SCREEN CAVITY MODEL
        (BRODE, 1988)
****************************************


 *** CAVITY CALCULATION - 1 ***        *** CAVITY CALCULATION - 2 ***
  CONC (UG/M**3)       =    .0000       CONC (UG/M**3)       =    .0000
  CRIT WS @10M (M/S) =    99.99         CRIT WS @10M (M/S) =    99.99
  CRIT WS @ HS (M/S) =    99.99         CRIT WS @ HS (M/S) =    99.99
  DILUTION WS (M/S)  =    99.99         DILUTION WS (M/S)  =    99.99
  CAVITY HT (M)      =     5.47         CAVITY HT (M)      =     5.23
  CAVITY LENGTH (M)  =    19.07         CAVITY LENGTH (M)  =    14.45
  ALONGWIND DIM (M)  =    13.70         ALONGWIND DIM (M)  =    22.90

CAVITY CONC NOT CALCULATED FOR CRIT WS > 20.0 M/S.  CONC SET = 0.0

****************************************
      END OF CAVITY CALCULATIONS
****************************************


     ***************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ***************************************

 CALCULATION          MAX CONC     DIST TO   TERRAIN
  PROCEDURE          (UG/M**3)     MAX (M)    HT (M)
--------------      -----------   -------    -------
SIMPLE TERRAIN        80.76           52.        0.

***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
***************************************************
```

07/29/08
16:14:24

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

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SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	1.00000
STACK HEIGHT (M)	=	6.7100
STK INSIDE DIAM (M)	=	.3048
STK EXIT VELOCITY (M/S)	=	19.1800
STK GAS EXIT TEMP (K)	=	743.0000
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	.0000
URBAN/RURAL OPTION	=	RURAL
BUILDING HEIGHT (M)	=	5.2000
MIN HORIZ BLDG DIM (M)	=	13.7000
MAX HORIZ BLDG DIM (M)	=	22.9000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 2.646 M**4/S**3; MOM. FLUX = 3.369 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	.0000	1	1.0	1.0	320.0	51.16	1.24	1.18	NO
100.	348.4	4	8.0	8.0	2560.0	7.97	8.20	6.38	SS
200.	225.8	4	5.0	5.0	1600.0	10.83	15.56	9.64	SS
300.	161.4	4	4.0	4.0	1280.0	13.20	22.61	12.62	SS
400.	124.8	4	3.5	3.5	1120.0	14.98	29.45	15.62	SS
500.	101.9	4	3.0	3.0	960.0	17.41	36.15	18.44	SS

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

41.	542.8	4	8.0	8.0	2560.0	7.03	3.67	3.88	SS

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH

```
   21.   443.0        4    8.0    8.0  2560.0    6.80    1.95    2.89    SS

 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****************************************
     *** REGULATORY (Default) ***
    PERFORMING CAVITY CALCULATIONS
  WITH ORIGINAL SCREEN CAVITY MODEL
          (BRODE, 1988)
****************************************


 *** CAVITY CALCULATION - 1 ***       *** CAVITY CALCULATION - 2 ***
  CONC (UG/M**3)       =     .0000     CONC (UG/M**3)       =     .0000
  CRIT WS @10M (M/S) =     99.99      CRIT WS @10M (M/S) =     99.99
  CRIT WS @ HS (M/S) =     99.99      CRIT WS @ HS (M/S) =     99.99
  DILUTION WS (M/S)  =     99.99      DILUTION WS (M/S)  =     99.99
  CAVITY HT (M)      =      5.47      CAVITY HT (M)      =      5.23
  CAVITY LENGTH (M)  =     19.07      CAVITY LENGTH (M)  =     14.45
  ALONGWIND DIM (M)  =     13.70      ALONGWIND DIM (M)  =     22.90

CAVITY CONC NOT CALCULATED FOR CRIT WS > 20.0 M/S.  CONC SET = 0.0

****************************************
      END OF CAVITY CALCULATIONS
****************************************


     ***************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ***************************************

 CALCULATION           MAX CONC    DIST TO   TERRAIN
  PROCEDURE           (UG/M**3)    MAX (M)    HT (M)
--------------       -----------   -------   -------
SIMPLE TERRAIN         542.8          41.         0.

***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
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APPENDIX E

Affidavit of Publication – Public Notice Meeting

Affidavit of Publication

STATE OF IDAHO)
COUNTY OF TWIN FALLS) SS.

I, Ruby Aufderheide, being first duly sworn upon oath, depose and say that I am Legal Clerk of the TIMES-NEWS, published daily at, Twins Falls, Idaho, and do solemnly swear that a copy of the notice of advertisement, as per clipping attached, was published in the regular and entire issue of said newspaper, and not in any supplement thereof, for one ~~consecutive~~ publication, commencing with the issue dated 19th day of August, 2008 and ending with the issue dated 19th day of August, 2008

And I do further certify that said newspaper is a consolidation, effective February 16, 1942, of the Idaho Evening Times, published theretofore daily except Sunday, and the Twin Falls News, published theretofore daily except Monday, both of which newspapers prior to consolidation had been published under said names in said city and county continuously and uninterruptedly during a period of more than twelve consecutive months, and said TIMES-NEWS, since such consolidation, has been published as a daily newspaper except Saturday, until July 31, 1978, at which time said newspaper began daily publication under said name in said city and county continuously and uninterrupted.

And I further certify that pursuant to Section 60-108 Idaho Code, Thursday of each week has been designated as the day on which legal notice by law or by order of any court of competent jurisdiction within the state of Idaho to be issued thereof Thursday is announced as the day on which said legal will be published.

Ruby Aufderheide

Ruby Aufdeheide, Legal Clerk

STATE OF IDAHO
COUNTY OF TWIN FALLS

On this 19th day of August, 2008, before me,

a Notary Public, personally appeared Ruby Aufdeheide, Ruby Aufderheide
known or identified to me to be the person whose name subscribed to the within instrument, and being by me first duly sworn, declared that the statements therein are true, and acknowledged to me that he executed the same.

Linda Capps McGuire

Notary Public for Idaho
Residing at Twin Falls, Idaho.

My commision expires: 5-19-09

LINDA CAPPS-McGUIRE
NOTARY PUBLIC
STATE OF IDAHO

PUBLIC NOTICE

Cargill Environmental Finance has applied for an air quality Permit To Construct for an anaerobic digester located at 3350 South 2400 East in Jerome, ID. An Informational meeting will be held in the Jerome City Library Conference Room located at 100 First Avenue East in Jerome, ID at 6:00pm on August 20, 2008.

PUBLISH: August 19, 2008

KLEINFELDER
Bright People. Right Solutions.

APPENDIX F

EPA letter regarding 40 CFR 60, Subpart JJJJ

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

RECEIVED

APR 28 2008

DEPARTMENT OF ENVIRONMENTAL QUALITY
STATE A Q PROGRAM

APR 24 2008

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

Jonathan Pettit
Air Quality Permit Analyst
Idaho Department of Environmental Quality
Air Quality Division
1410 N. Hilton
Boise, Idaho 83706-1255

Dear Mr. Pettit:

This is in response to your request for guidance regarding the use of Air to Fuel Ratio controllers (AFR) on lean burn and rich burn engines that are subject to the New Source Performance Standards for Stationary Spark Ignition Internal Combustion Engines at 40 CFR Part 60, Subpart JJJJ. Specifically, you request clarification of the provisions at 40 CFR Part 60, Section 60.4243(g) regarding: 1) whether use of an AFR is an enforceable requirement for engines that use three way catalysts; and 2) does the use of an AFR apply to both lean burn and rich burn engines that use three way catalysts.

Although not stated explicitly in 40 CFR Part 60, Subpart JJJJ, the use of an AFR is an enforceable requirement for rich burn engines that use three way catalysts. Question 10.2.2 in the 40 CFR Part 60, Subpart JJJJ Response To Comment document clarifies this requirement by stating that:

> An AFR is necessary and must be included with the operation of three way catalysts on rich burn engines and will have to be operated in an appropriate manner to ensure the proper engine operation and to minimize emissions.

Three way catalysts simultaneously reduce oxides of nitrogen (NO_X), hydrocarbons (HC) and carbon monoxide (CO) through a series of reduction and oxidation reactions for engines that operate at or near stoichiometric conditions. The AFR is necessary because it maintains the appropriate air to fuel ratio so that these oxidation and reduction reactions can take place in the catalyst. In their absence, the three way catalyst would not work properly, and the engine would be unable to consistently comply with the emission requirements specified in 40 CFR Part 60, Subpart JJJJ.

The provisions at 40 CFR Part 60, Section 60.4243(g) are not intended to apply to lean burn engines. This is because three way catalysts are designed to reduce HC, CO and NO_X emissions from engines that run at or near stoichiometric conditions and not from lean burn engines that operate at very lean air to fuel ratios and emit exhaust gases with high levels of excess air.

This response has been coordinated with the Office of General Counsel and the Office of Air Quality Planning and Standards. If you have any questions, please contact John DuPree of my staff at (202) 564-5950.

Sincerely yours,

Ken Giglello

Kenneth A. Giglello, Acting Director
Compliance Assessment and Media Programs Division
Office of Compliance